

Policy: 4A-5- Intersection Control Evaluation (ICE) Policy

Section: Traffic Control - Traffic Operations

Office/Department: oCOMSR CHIEF ENGINEER

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INTERSECTION CONTROL EVALUATION (ICE) POLICY

NOTE: As indicated in the [letter issued](#) by the Chief Engineer on 06/08/2017, this ICE policy takes effect on 7/1/2017. Therefore, an ICE must be performed for any project or proposed work that does not have concept approval by July 1, 2017. For GDOT projects, if consultant services have already been procured prior to the effective date, but the concept has not been approved, the Office of Traffic Operations will perform the ICE evaluation upon request by the project manager. Additionally, if performing the ICE evaluation for projects that have schedules already set by July 1, 2017 would delay the concept report submittal, the ICE may be performed during preliminary design phase and should be submitted for approval no later than one-third of the way through the time allotted for preliminary design.

I. INTRODUCTION & BACKGROUND

In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each State prepare a Strategic Highway Safety Plan (SHSP) by which to prioritize safety funding investments. Intersections quickly became a common component of a majority of States' SHSP emphasis areas and HSIP project lists, including in [Georgia's SHSP](#). In 2010, AASHTO published the first edition of the [Highway Safety Manual](#) (HSM), which mainstreamed a rigorous scientific approach and a new generation of statistical models for evaluating the substantive safety performance of highways and intersections. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and to further leverage the safety advancements noted above for intersection improvements beyond just the safety program. Approximately **one-third of all traffic fatalities** and roughly **seventy five percent of all traffic crashes** in Georgia occur at or adjacent to intersections. Accordingly, the [Georgia SHSP](#) includes an emphasis on enhancing intersection safety in order to advance toward the [Toward Zero Deaths](#) vision embraced by the [Georgia Governor's Office of Highway Safety \(GOHS\)](#). This ICE policy was developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety toward those ends.

Intersections are a necessary component of the road network, connecting different routes and facilities, and providing the needed access to adjacent residential, commercial and industrial development. They are comparatively discrete, comprising only a small portion of total road system mileage, but account for a high percentage of all crashes, especially severe crashes that produce injuries and fatalities. Intersections are planned points of conflict for all modes of users – pedestrians, bicyclists, motorcyclists, transit, trucks and passenger vehicles.

In recent years, a number of innovative intersection designs have been introduced across the United States. Experience to date with these innovative designs suggests significantly greater safety and operational benefits could be realized at a system level

with broader implementation. Consequently, a consistent and objective evaluation process that is built upon performance-based criteria is needed. The Intersection Control Evaluation (ICE) policy and process fulfills that need.

The ICE process is structured to run concurrently with existing project development activities and is expected to result in more thoroughly vetted intersection control choices yielding more confident project programming decisions made earlier in the process.

II. PURPOSE

The ICE process serves the mission of GDOT, which is to “deliver a transportation system focused on innovation, safety, sustainability and mobility”. In fulfilling that mission, GDOT strives to improve, construct and maintain a world class network of highways, roads and bridges.

Improvements to intersections are typically undertaken for one or more of the following reasons:

- As a congestion mitigation project;
- As part of a broader corridor improvement/widening project;
- As a safety improvement project;
- As a pedestrian and/or bicycle facility enhancement project;
- A change of access to an adjacent parcel of land or land development project;
- As a part of pavement rehabilitation or bridge projects.

The purpose of ICE is to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets the project purpose and reflects the overall best value in terms of specific performance-based criteria.

As with most traffic studies, ICE is scalable, meaning the corresponding level of effort for screening and analysis should be proportional to the magnitude and nature of the project, i.e. less effort for simple, more effort for complex. Generally, projects consisting of only one isolated intersection will require less overall analysis and documentation than a series of intersections along an arterial corridor proposed for widening or major rehabilitation. The premise of an ICE is the same whether it involves new intersections or modification to existing intersections.

Initially, the results of ICE help develop the project scope and concept development; ultimately, the ICE documents the selection of the preferred alternative to be carried forward to initial and final design. As depicted in Exhibit 1, a complete ICE process consists of two (2) distinct stages that must be completed: Stage 1 Screening and Stage 2 Alternative Selection. By dividing intersection control evaluation into two stages, unnecessary effort is avoided for alternatives that do not pass the initial practical screening.



Exhibit 1. Two-Stage ICE Process

III. APPLICABILITY

Required. An ICE is required for any intersection improvement (e.g., a new intersection, an intersection modification, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where one or both of the following conditions are met:

- The intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System;
- The intersection will be designed or constructed using State or Federal funding.

Approvals. For the purposes of ICE, projects are grouped into three categories that require different levels of approval depending on the type of improvement.

- **Level 1** projects are to be approved by the Chief Engineer (or delegate). Level 1 includes any projects that are going through the PDP process (ICE approved as part of the concept approval) as well as any intersection improvement that requires a new or revised signal permit (ICE approved as part of permit process) or a new median opening (ICE approved as part of new median opening request).
- **Level 2** projects will be approved by the District Engineer (or delegate) who will notify the State Traffic Engineer of the outcome of the ICE via email. Level 2 projects include anything that does not fall into Level 1 (such as driveway permits, special encroachment permits or quick response projects), where a leg will be added to an intersection or where intersection control will be changed (ex. TWSC to AWSC or roundabout).
- **Level 3** projects will be approved by the District Engineer (or delegate). Level 3 includes projects that do not fall under Level 1 or Level 2. For Level 3 projects the changes to the intersection must be minor and not alter the intersection control, such as adding or extending a turn lane as part of a driveway permit, quick response project, or maintenance work.

On completion of the study, if the recommended alternative from the ICE analysis will not be implemented, the reason for not implementing the recommended alternative should be explained and documented along with the outputs and supporting documentation for ICE Stage 1 and Stage 2, in the TE Study or as a standalone study. A [waiver form](#) along with the full study and supporting documentation should be submitted for approval to the Chief Engineer (or delegate) for Level 1 projects or the District Engineer (or delegate) for Level 2 or Level 3 projects. For Level 2 projects, a copy of the study and waiver form should also be sent to the State Traffic Engineer to serve as notification of the change.

Waiver Eligible. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. The Chief Engineer (or delegate) will approve waiver requests for Level 1 projects and the District Engineer (or delegate) will approve waiver requests for Level 2 and Level 3 projects. For Level 2 projects, the District Engineer (or delegate) will send a copy of any approved waivers to the State Traffic Engineer. Any questions regarding the waiver process may be routed to the State Traffic Engineer. Examples of scenarios in which an ICE waiver request may be considered include:

- Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal;
- The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably;
- The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
 - low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day);
 - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity);
 - layout has no unusual or undesirable geometric features (such as restricted sight distance);
 - The proposed changes are not expected to adversely affect safety.

Not Required. An ICE is not required under the following circumstances:

- The proposed work does not change the intersection control **OR** increase the footprint of the intersection:
 - A project that will not do any widening where there is no change to intersection geometry or control (i.e. Sidewalk/streetscape improvements, bridge replacement resurfacing). If an intersection is being realigned or relocated, an ICE evaluation or ICE waiver request will still be required.
 - The proposed work is part of a signal permit revision where no changes to the physical footprint of the intersection will be made.
- Routine traffic signal timing and equipment maintenance.
- For driveway permits, where the driveway is not a new leg to an already existing intersection, that satisfy either of the following criteria:
 - The driveway is along a divided, multilane roadway where the access will be limited to a closed median (no median opening) with only right-in/right-out access.
 - The driveway is along an undivided roadway and the development will not be required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Local road authorities may choose to require ICE for scenarios beyond those listed above.

IV. RESPONSIBILITY

The ICE process is the same for all intersection improvements regardless of sponsor; it is conducted the same way by GDOT, local road authorities, or any private entity. The responsibility for conducting the ICE lies with the PE originator. The project that

necessitates the ICE may originate from within GDOT or from an outside entity, such as local government or a developer or landowner. An ICE should be prepared under the supervision of a Professional Engineer licensed in the State of Georgia.

V. PROCESS OVERVIEW/ROLE IN PDP

As stated in Section II, a complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort.

For most spot intersection improvement projects, Stage 1 and Stage 2 will be performed seamlessly and documented in a TE study. For corridor projects and those consisting of multiple intersections, Stage 1 should be performed before the Initial Concept Team Meeting and Stage 2 should ideally begin after the Initial Concept Team Meeting. If the preferred alignment is not determined by the Initial Concept team meeting then the ICE evaluation will take place as soon as preferred alignments are identified.

Stage 1 – Screening. Stage 1 is conducted as early in the project development process as possible and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility.

A Stage 1 evaluation normally requires sufficient analysis or subject matter expertise to estimate the preliminary footprint of the intersection to determine whether or not an alternative is practical to implement. The Stage 1 evaluation should also answer the following:

- Does the alternative meet the transportation purpose and need?
- Does the alternative address the key system performance criteria (safety, non-motorized users, operational quality, etc.)?
- Does the alternative meet the needs and values of the local community and directly affected stakeholders?

For corridor projects containing more than one intersection that are following the PDP, a **Concurrence Memo** should be generated to be signed by the Chief Engineer (or delegate) that lists the recommended alternative(s) to carry in to ICE Stage 2. On single intersection projects, a concurrence memo is not required, but the Chief Engineer (or delegate) or District Engineers (or delegate) may still be consulted to confirm that the appropriate alternatives are being carried forward for further analysis in stage 2.

The ICE Stage 1 should be documented on the GDOT ICE Stage 1: Screening Decision Record, which can be found in the [GDOT ICE Spreadsheet Tool](#). Please also refer to the [ICE Stage 1 Flow Chart](#) for additional assistance in completing ICE Stage 1.

Stage 2 – Alternative Selection. Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. The combined output of Stage 1 and Stage 2 along with supporting documentation should be documented in the approved Concept Report or as a standalone document. Related studies referenced in the PDP and other Policies, such as a traffic impact analysis, signal warrant analysis, etc., may need to be partially or wholly completed in order to perform ICE Stage 2.

The ICE Stage 2 should be documented on the GDOT ICE Stage 2: Alternative Selection Decision Record, which can be found in the [GDOT ICE Spreadsheet Tool](#). Please also refer to the [ICE Stage 2 Flow Chart](#) for additional assistance in completing ICE Stage 2. The complete Stage 2 output includes the ICE Decision Record, along with supporting analysis and documentation.

If only one alternative is determined to be feasible from the ICE Stage, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. If a waiver is not submitted, then formal documentation of ICE Stage 2 is still required.

VI. Final Documentation

A complete ICE document consists of the combination of the outputs from both Stage 1 and Stage 2 along with supporting documentation, to be included in the approved project Concept Report (or equivalent) or as a stand-alone document. For standalone intersection projects both Stage 1 and Stage 2 should be included as attachments to the concept report. For longitudinal projects, if possible, both Stage 1 and Stage 2 should be included as attachments to the concept report. However, if it is not possible to complete Stage 2 during the concept phase, Stage 1 should be included in the concept report and Stage 2 should be completed and submitted for approval no later than one-third of the way through the time allotted for the preliminary design phase.

For locations where an ICE waiver is to be submitted in lieu of an ICE study, the ICE waiver should be attached to the concept report for PDP projects or included in the appropriate submittal for other types of projects. If a waiver is to be submitted, the project team is encouraged to coordinate with the Office of Traffic Operations prior to concept submittal to ensure that the waiver will be acceptable.

If issues arise post concept approval that will change the outcome of the ICE, such as a change in the roadway alignment, determination of new median opening location, or identification of a previously unknown environmental impact, the ICE documentation should be revised and resubmitted for approval or a waiver should be requested.

References:

[Click here to enter Policy references, if any.](#)

History:

updated logo: 10/23/18;

new policy: effective 07/01/17, published: 07/17/07